Abstract

[Project Information]

Project Title :	Development of a Support System for Designing Regional Climate Change Adaptation Options in Consideration of the Effects and Limitations
Project Number :	JPMEERF20222G01
Project Period (FY) :	2022-2024
Principal Investigator :	HIJIOKA Yasuaki
(PI ORCID) :	ORCID0000-0003-2297-3981
Principal Institution :	National Institute for Environmental Studies 16-2 Onogawa, Tsukuba, Ibaraki, 305-8506 Japan Tel: +81-29-850-2961 E-mail: hijioka@nies.go.jp
Cooperated by :	National Agriculture and Food Research Organization, Tokyo Metropolitan University
Keywords :	Regional Climate Change Impacts, Adaptation option planning support, Priorities, Crop yield, Disaster prevention and mitigation

[Abstract]

The impact of climate change is increasingly apparent worldwide, and Japan is promoting adaptation strategies based on scientific knowledge under the Climate Change Adaptation Act. Local governments are required to formulate adaptation plans that reflect regional characteristics and future uncertainties. However, this remains challenging due to the complexity of evaluating costs, benefits, and uncertainties, highlighting the need for decision-making support systems that enable flexible response strategies and prioritization of adaptation measures.

This project aims to develop impact assessment methods to quantitatively assess the effectiveness of adaptation options in agriculture and disaster risk reduction, thereby providing scientific support for local governments. It also aims to establish a climate change adaptation planning support system that incorporates regional characteristics.

In sub-theme 1, a comprehensive support system was developed by integrating crop yield prediction data from the agricultural sector (sub-theme 2) and flood risk data from the disaster risk reduction sector (sub-theme 3). The system includes tools for assessing adaptation capacity, selection of adaptation options and an associated database. Fruit-producing municipalities were clustered, and decision analysis methods were reviewed to reflect local contexts. These tools were developed in collaboration with Local Climate Change Adaptation Centers (LCCACs) and made available through the Climate Change Adaptation Information Platform (A-PLAT).

In sub-theme 2, we developed a crop adaptation assessment model by integrating key data on agricultural production across Japan, including cultivation calendars, soil classification, fertilizer loads, and farm management information. The model provides a scientific basis for climate change adaptation strategies that balance environmental sustainability and economic efficiency by incorporating crop yield predictions with soil factors as explanatory variables, and crop selection based on profitability, environmental load, and climate adaptability.

Sub-Theme 3 focused on agricultural land and evaluated the effectiveness of Eco-DRR (Ecosystem-based Disaster Risk Reduction) using statistical models. The analysis revealed that the flood prevention function of agricultural lands represents an effective adaptation option on a national scale, even in cases where the land is abandoned. In addition, adaptation options for future flood risks were proposed by projecting municipal-level flood probabilities based on future rainfall and land use under climate change.

Overall, this project has developed a science-based decision support framework that integrates both agriculture and disaster risk reduction, providing practical tools to support the prioritization and implementation of effective adaptation strategies by local governments.

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This study was supported by the Environment Research and Technology Development Fund of the ERCA (JPMEERF20222G01) funded by the Ministry of the Environment.